

Crucible Steel 15-5 Precipitation Hardening Stainless Steel

Category : Metal , Ferrous Metal , Martensitic , Stainless Steel , Precipitation Hardening Stainless

Material Notes:

Crucible 15-5 is a Premium Quality precipitation-hardening stainless steel which is capable of high strength and hardness levels after a relatively simple heat-treatment procedure. This grade is a Vacuum Arc remelted for improved cleanliness. Crucible 15-5 is martensitic and magnetic in both the solution-treated and precipitation hardened conditions. It has a high resistance to crack propagation, good transverse properties, and corrosion resistance is normally superior to the regular martensitic chromium-type stainless steels. Because of the single low-temperature(900-1150°F) precipitation-hardening heat treatment of this grade, scaling and distortion are virtually eliminated. This enables material to be finish machined to close tolerances prior to heat treatment. Information provided by Crucible Specialty Metals.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Crucible-Steel-15-5-Precipitation-Hardening-Stainless-Steel.php

Physical Properties	Metric	English	Comments
Density	7.75 g/cc	0.280 lb/in ³	A
	7.86 g/cc	0.284 lb/in ³	H1150

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	302	302	A
	332	332	H1100
	409	409	H925
Hardness, Rockwell C	27	27	H1150-M
	36	36	H1075
	44	44	H900
Tensile Strength, Ultimate	862 MPa	125000 psi	H1150-M
	1030 MPa	150000 psi	A
	1170 MPa	170000 psi	H1025
	662 MPa	96000 psi	H1150
	@Temperature 538 °C	@Temperature 1000 °F	
	820 MPa	119000 psi	H1150
@Temperature 538 °C	@Temperature 1000 °F		
Tensile Strength, Yield	855 MPa	124000 psi	H1150
	@Temperature 316 °C	@Temperature 600 °F	

Mechanical Properties	1190 MPa Metric	173000 psi English	Comments
	@Temperature 316 °C	@Temperature 600 °F	
Tensile Strength, Yield	862 MPa	125000 psi	H1150
	@Strain 0.200 %	@Strain 0.200 %	
	1030 MPa	150000 psi	H1075
	@Strain 0.200 %	@Strain 0.200 %	
	1280 MPa	185000 psi	H900
	@Strain 0.200 %	@Strain 0.200 %	
	641 MPa	93000 psi	H1150
	@Strain 2.00 %, Temperature 538 °C	@Strain 2.00 %, Temperature 1000 °F	
	731 MPa	106000 psi	H900
	@Strain 2.00 %, Temperature 538 °C	@Strain 2.00 %, Temperature 1000 °F	
	827 MPa	120000 psi	H1150
	@Strain 2.00 %, Temperature 316 °C	@Strain 2.00 %, Temperature 600 °F	
	1030 MPa	150000 psi	H900
	@Strain 2.00 %, Temperature 316 °C	@Strain 2.00 %, Temperature 600 °F	
Elongation at Break	10 %	10 %	in 2", A
	15 %	15 %	in 2", H1025
	22 %	22 %	in 2", H1150-M
	10 %	10 %	in 2"; H900
	@Temperature 316 °C	@Temperature 600 °F	
	12 %	12 %	in 2", H1150
	@Temperature 316 °C	@Temperature 600 °F	
	15 %	15 %	in 2"; H900
	@Temperature 538 °C	@Temperature 1000 °F	
	15 %	15 %	in 2", H1150
	@Temperature 538 °C	@Temperature 1000 °F	
Reduction of Area	50 %	50 %	H900
	54 %	54 %	H925

Mechanical Properties	Metric	English	Comments
	31 % @Temperature 316 °C	31 % @Temperature 600 °F	H900
	46 % @Temperature 538 °C	46 % @Temperature 1000 °F	H900
	54 % @Temperature 316 °C	54 % @Temperature 600 °F	H1150
	55 % @Temperature 538 °C	55 % @Temperature 1000 °F	H1150
Rupture Strength	413.7 MPa @Temperature 32.2 °C, Time 3.60e+6 sec	60000 psi @Temperature 90.0 °F, Time 1000 hour	
	655.0 MPa @Temperature 482 °C, Time 360000 sec	95000 psi @Temperature 900 °F, Time 100 hour	
	1089 MPa @Temperature 316 °C, Time 3.60e+6 sec	158000 psi @Temperature 600 °F, Time 1000 hour	
	1131 MPa @Temperature 316 °C, Time 360000 sec	164000 psi @Temperature 600 °F, Time 100 hour	
Modulus of Elasticity	197 GPa	28500 ksi	Tension; H900
Shear Modulus	68.9 GPa	10000 ksi	H1075 and H1150
	77.2 GPa	11200 ksi	H900

Thermal Properties	Metric	English	Comments
CTE, linear	10.8 µm/m-°C @Temperature 21.1 - 93.3 °C	6.00 µin/in-°F @Temperature 70.0 - 200 °F	A and H900
	11.3 µm/m-°C @Temperature 21.1 - 93.3 °C	6.30 µin/in-°F @Temperature 70.0 - 200 °F	H1075
	11.3 µm/m-°C @Temperature 21.1 -	6.30 µin/in-°F @Temperature 70.0 -	A

Thermal Properties	427 °C Metric	800 °F English	Comments
	11.9 µm/m-°C	6.60 µin/in-°F	H1150
	@Temperature 21.1 - 93.3 °C	@Temperature 70.0 - 200 °F	
	13.0 µm/m-°C	7.20 µin/in-°F	H1150
	@Temperature 21.1 - 427 °C	@Temperature 70.0 - 800 °F	
Specific Heat Capacity	0.460 J/g-°C	0.110 BTU/lb-°F	
	@Temperature 0.000 - 100 °C	@Temperature 32.0 - 212 °F	
Thermal Conductivity	17.9 W/m-K	124 BTU-in/hr-ft ² -°F	H900
	@Temperature 149 °C	@Temperature 300 °F	
	22.6 W/m-K	157 BTU-in/hr-ft ² -°F	H900
	@Temperature 482 °C	@Temperature 900 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.070 %	<= 0.070 %	
Chromium, Cr	14 - 15.5 %	14 - 15.5 %	
Copper, Cu	2.5 - 4.5 %	2.5 - 4.5 %	
Iron, Fe	>= 71.91 %	>= 71.91 %	As Remainder
Manganese, Mn	<= 1.0 %	<= 1.0 %	
Nb + Ta	0.15 - 0.45 %	0.15 - 0.45 %	
Nickel, Ni	3.5 - 5.5 %	3.5 - 5.5 %	
Phosphorous, P	<= 0.040 %	<= 0.040 %	
Silicon, Si	<= 1.0 %	<= 1.0 %	
Sulfur, S	<= 0.030 %	<= 0.030 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000770 ohm-cm	0.0000770 ohm-cm	H900
	0.0000980 ohm-cm	0.0000980 ohm-cm	A

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